MICROWAVE IRRADIATION

DESCRIPTION: Large microwave irradiation medical waste treatment units include an initial destruction phase. The waste is automatically fed into a waste grinding device where it is shredded and sprayed with steam to increase the moisture content of the waste to approximately 10 percent. The moist ground waste is then heated by exposure to six microwave irradiation units over a 2 hour period. This process heats the waste to >90 °C.

OPERATING PARAMETERS: The factors which affect microwave treatment of medical waste include the frequency and wavelength of the irradiation, the duration of the exposure, destruction and moisture content of the waste material, process temperature, and the mixing of the waste during treatment.

WASTES SUITABLE FOR TREATMENT BY MICROWAVE IRRADIATION: Microwave treatment units can treat most infectious waste with the exception of cytotoxic, hazardous, or radioactive wastes. Contaminated animal carcasses, body parts, human organs, and large metal items may also be unsuitable for treatment by microwave irradiation.

INDICATOR ORGANISMS: Thermally resistant indicator organisms are selected to provide a maximum challenge. *Bacillus subtilis* (globigii) ATCC 9372 (10^4) may be used to demonstrate a 4 $\log_{10}$ reduction of viable spores.

TEST PROCEDURE: Dried test spores are placed in a steam permeable container and added to the waste stream after the waste is ground and sprayed with steam but before exposure to microwave irradiation. The microwave unit is operated under normal conditions. At the conclusion of the cycle the test organisms are removed from the waste and recovered within 24 hours. To recover the test organism the test discs or strips should be aseptically inoculated into 5.0 mL soybean-casein digest broth medium (or equivalent) and incubated for at least 48 hours (30 °C for *B. subtilis*). At the end of the incubation period the media should be examined for turbidity as a sign of bacterial growth. Any growth should be subcultured onto appropriate media to confirm the identity of the organism as the indicator organism or an environmental contaminant.